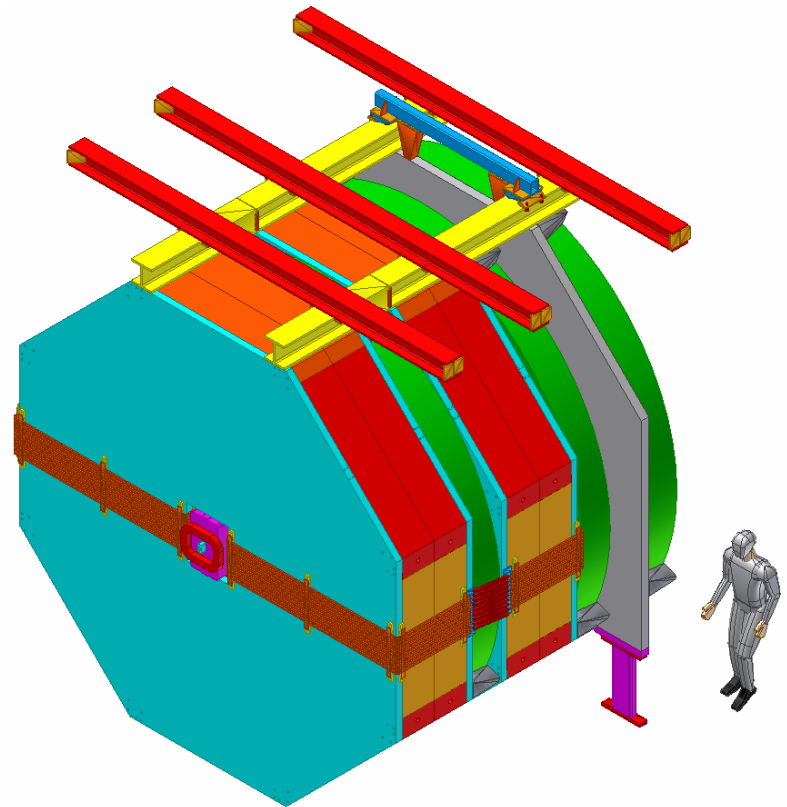


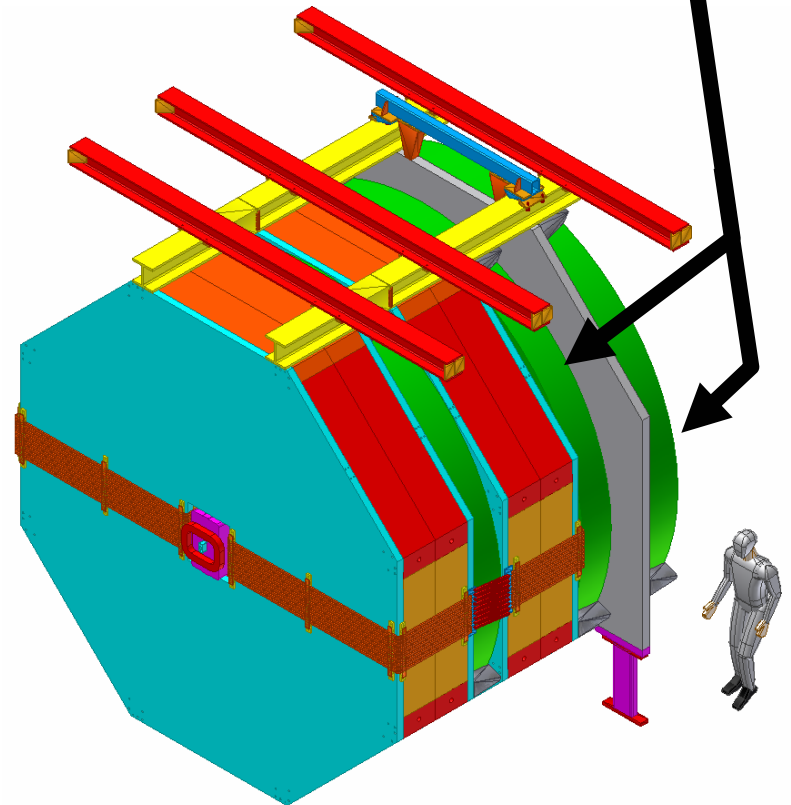
WBS 1.5 Staged Plan, Schedule and Cost Profile

- Staged Detector
- Project Flow and Critical Path, Need by and Ready by Dates
- Cost and Labor
- Installation
- Responses to CD-1 Recommendations



Staged Detector

- The Stage 1 Muon System consists of the two downstream muon stations (Stations 2 and 3).
- The Need By date for these two stations is 8/21/2009.
- The Stage 1 System provides offline muon identification.
- Stage 1 does not allow for the Level 1 di-muon trigger.
- Last station (Station 1) will provide full functionality, Need By date is 8/1/2010.



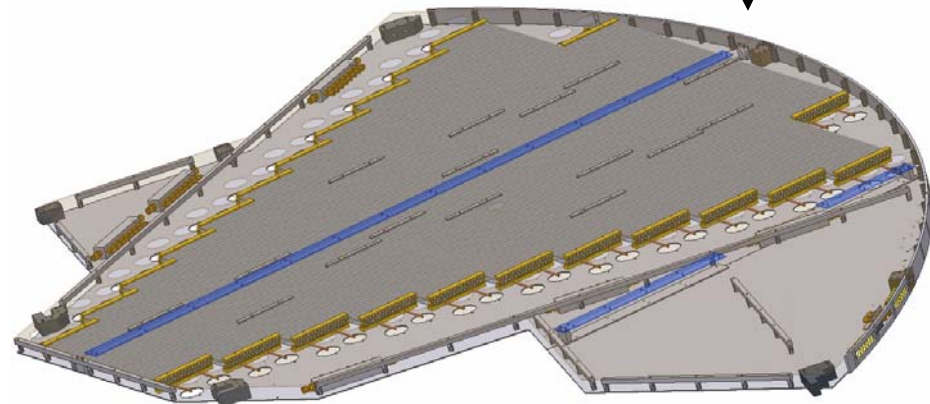
Scheduling Strategy: Planks



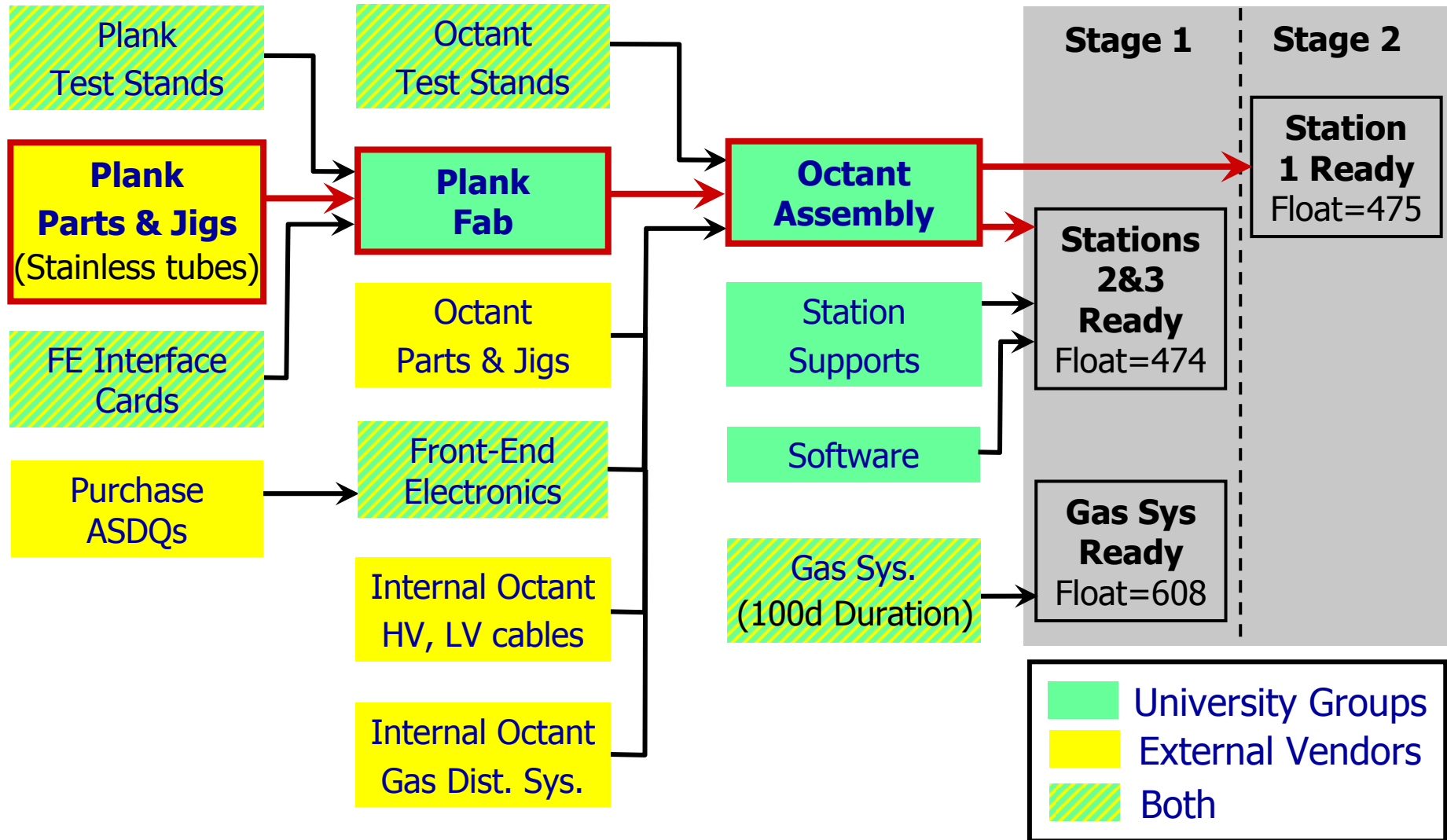
- There are two tasks that are slow (of very long duration):
 - **Making planks**
 - Fabricating plank parts in the Vanderbilt machine shop
 - *We give these priority in deciding what to start first.*
- Plank duration... (1479 planks to make)
 - Rate: 1 per day per institution (Illinois, Puerto Rico, Vanderbilt)
 - **27.5 months** duration (calendar time).
- Plank part duration...
 - Slightly less than this.
- The stainless steel tubes used are are major cost item and have a long delivery time (4-6 months), this must be factored into our planning.

Scheduling Strategy: Octants

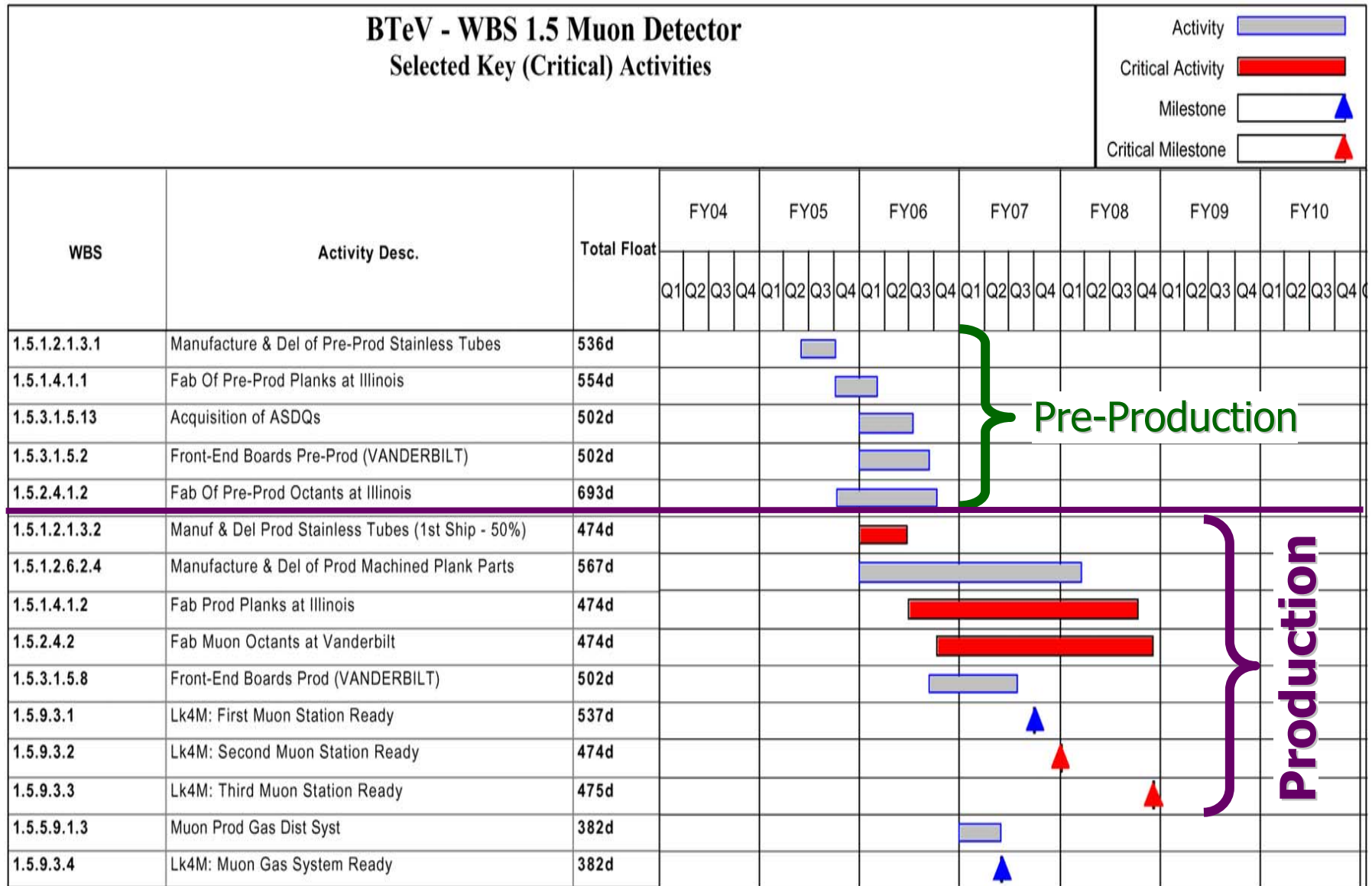
- Assembling our “final product” – octants:
 - 1/2 to 2/3 of the labor reqd is in assembling the support structure...
 - ... and then adding the planks.
 - We then add the plank front-end electronics, gas system tubing, HV, LV cabling
 - Beginning to end, all of above can be done for 8 octants in three weeks (2 days each)
 - We will use octants to “store” planks as they are completed, **so we need support structure “early”**
 - The rest, including FEs, can be purchased, fabricated, and installed later, at some more convenient time



Description of Project Flow



Critical Path Gantt Chart



Need By vs. Ready By

Station	Ready By	Need By	Float
2	7/02/2007	8/21/2009	537 days
3	9/01/2007	8/21/2009	474 days
1	9/08/2008	8/01/2010	475 days

- Ready date for station 2 set by availability of FE cards
- Ready date for station 1 set by plank production
- **Clearly plenty of float**
- May install stations in earlier shutdown periods if things are going very well.

Secondary	Ready By	Need By	Float
Gas Sys	3/05/2007	8/03/2009	608 days

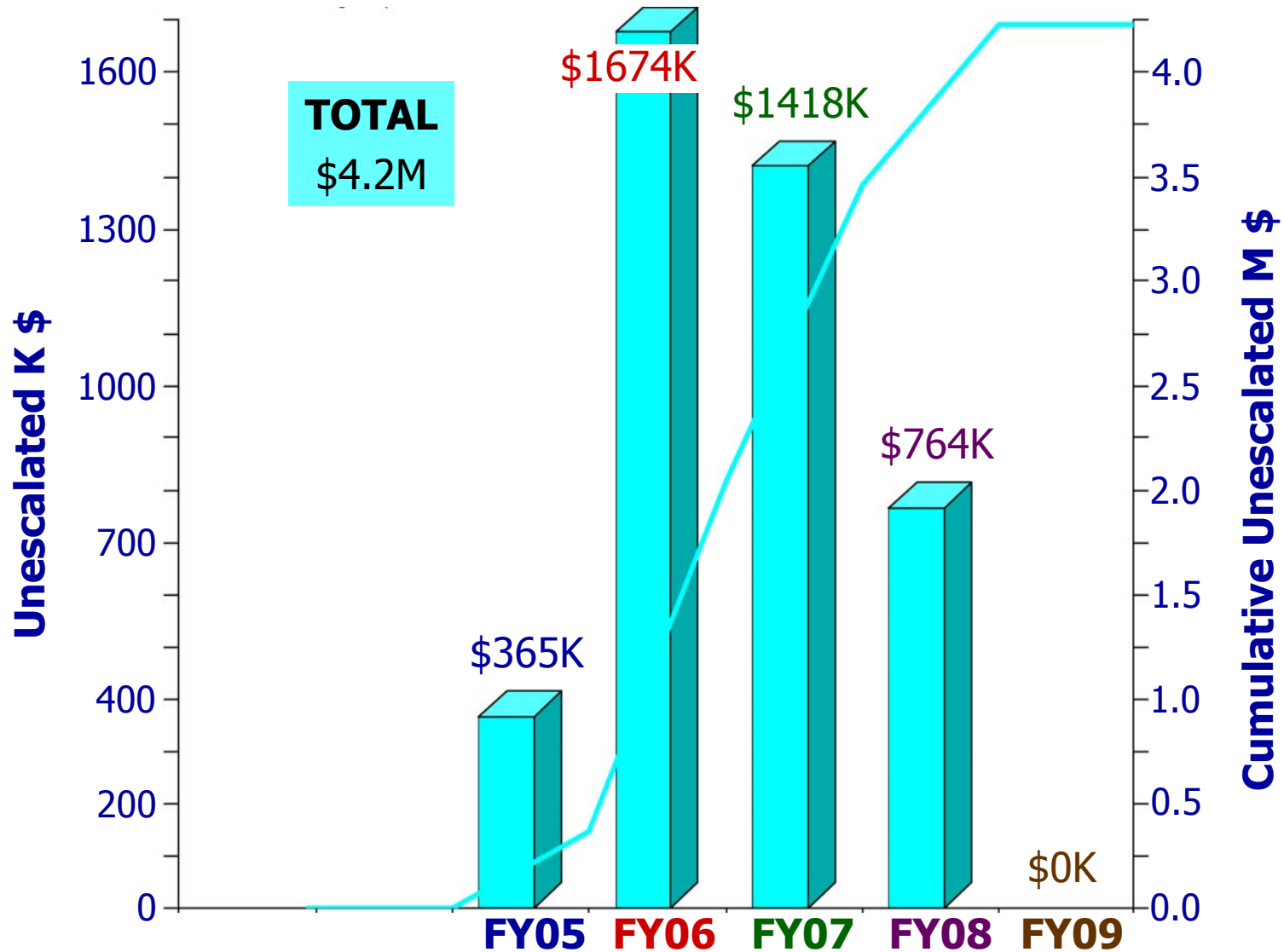
- Gas System: **a completely independent activity**
 - **100 days duration and 608 days of float.**

What If?

Station	Need By	Float	Case 1	Case 2
2	8/21/2009	537 days	537 days	477 days
3	8/21/2009	474 days	414 days	442 days
1	8/01/2010	475 days	415 days	475 days

- **Case 1:** A three month (60 days) delay in acquiring the stainless steel tubes reduces the floats on Stations 3 and 1 by an equivalent amount. (No effect on Station 2).
 - If the planks take 60 days longer to make, this is equivalent.
 - *However, we also have 2.5 years to make up for this delay by increasing plank production rate at the institutions.*
- **Case 2:** A three months (60 day) delay in finishing the Front-End cards delays Station 2 by 60 days, Station 3 by 32 days. There is no delay for Station 1.
 - A 60 day delay in acquiring the ASDQs is equivalent to this.

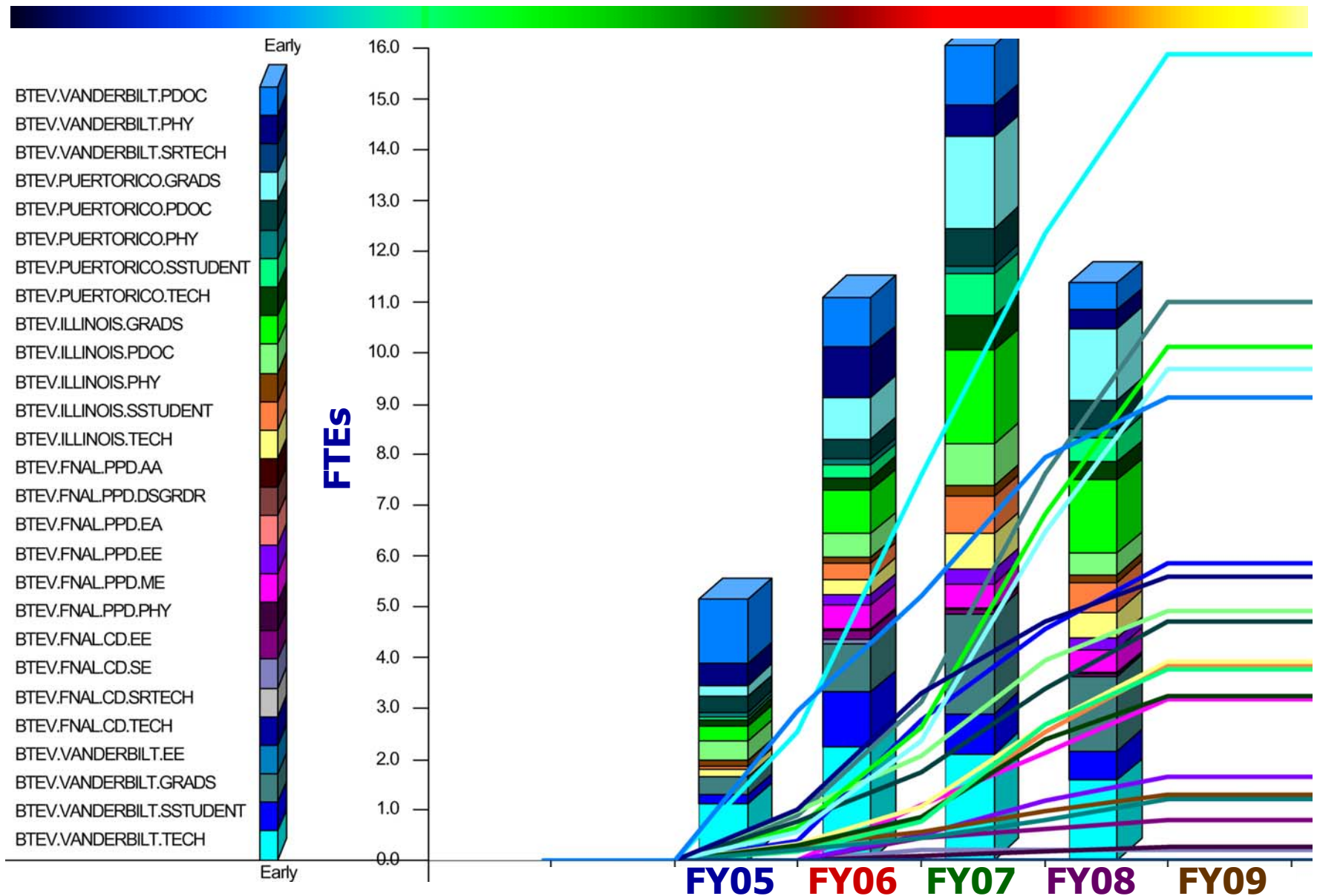
Cost Profile



Cost by Subproject

Activity ID	Activity Name	Base Cost (\$)	Material Contingency (%)	Labor Contingency (%)	Total FY05	Total FY06	Total FY07	Total FY08	Total FY09	Total FY05-09
1.5.1	Muon Detector Planks	1,498,016	51	35	224,133	883,521	928,011	182,281	0	2,217,946
1.5.2	Muon Detector Stations	328,787	40	35	62,038	221,776	133,093	40,076	0	456,982
1.5.3	Muon Detector Electronics	1,367,703	41	18	40,118	891,297	341,271	611,194	0	1,883,880
1.5.4	Muon Detector Test Stands	156,726	45	50	65,448	42,949	119,421	0	0	227,818
1.5.5	Muon Detector Gas System	118,953	50	0	0	106,050	63,354	0	0	169,404
1.5.6	Muon Detector Software	0	0	0	0	0	0	0	0	0
1.5.8	Muon Detector Subproj Mgmt	741,057	24	25	128,917	266,668	265,961	263,603	0	925,150
1.5 Subproject 1.5		4,211,242	45	27	520,654	2,412,260	1,851,111	1,097,154	0	5,881,179

Labor Profile



Installation



- It will take 10-15 working days to install the first two muon stations and three working days to connect services and test/debug them. The final station, which is between the two halves of the toroid assembly and will be a little harder to install, requires 5-10 working days to install and two days to connect and test.
- The main other installation project is the installation of the gas system. We assume that the gas line from the gas house to the collision hall will be installed by the time we arrive. Control lines, solenoids, and distribution lines to each octants must be installed, and the installation needs to be check out and tested. We estimate all of this will take 5-10 working days.

CD-1 Recommendations



- The primary recommendation was that we hire a full-time quality assurance engineer for the duration of the project.
 - After discussing this with project management, it was decided that additional effort will be added to the project office to handle QA issues for BTeV. The muon project will hire a full-time technician to handle QA and project oversight.
 - We have added this technician to our WBS, and the cost of this technician is the main change in our base cost.
- Actively pursue forward funding.
 - We have proposed \$1M in forward funding to Vanderbilt and are in discussions with the Dean of A&S, Vice-Provost for Research, and the Provost.